

**GISLab Accomplishments, Interim Report
1-August-2002 to 26-June-2003**

PUBLICATIONS

Publications - peer review

Fu, P., and P.M. Rich. 2002. A geometric solar radiation model with applications in agriculture and forestry. *Computers and Electronics in Agriculture* 37:25-35.

Rasmussen, S., M.J. Raven, G.N. Keating, and M.A. Bedeau, 2003, Collective intelligence of the artificial life community on its own successes, failures, and future, *Artificial Life Journal* 9(2). In press.

Wang, J., P.M. Rich, and K.P. Price. 2003. Temporal responses of NDVI to precipitation and temperature in the central Great Plains, USA. *International Journal of Remote Sensing* 24:2345-2364.

Publications – peer review, in press

Keating, G.N., P.M. Rich, P.M., and M.S. Witkowski. 2003. Challenges for enterprise GIS. LA-UR-02-1830. *URISA Journal* 15(2). In press.

Publications – peer review, submitted

Wang, J. P.M. Rich, K.P. Price and W.D. Kettle. 2003. Relations between NDVI and Tree Productivity in the Central Great Plains. *International Journal of Remote Sensing*. Provisionally Accepted.

Witkowski, M.S., P.M. Rich, and G.N. Keating. 2003. Enterprise GIS Design, *International Journal of Geographic Information Systems*. LA-UR#: 03-1688. In review.

Publications – peer review, manuscripts complete, to be submitted soon

Fu, P. and P.M. Rich. 2003. Landscape patterns of insolation in the vicinity of Rocky Mountain Biological Laboratory, Colorado. *International Journal of GIS*.

Fu, P. and P.M. Rich. 2003. Assessing topographic influences on incoming solar radiation at landscape scales. *Annals of the Association of American Geographers*.

Keating, G.N. 2003. The role of water in cooling ignimbrites: implications for welding, devitrification, and secondary eruptions. *Journal of Volcanology and Geothermal Research*.

Rich, P.M., and P. Fu. 2003. GIS-based models of solar radiation at landscape scales. *International Journal of GIS*.

Yao, J., and P.M. Rich. 2003. Woody canopy influences on understory plants during oldfield succession. *Journal of Ecology*.

Publications - proceedings, reports, book chapters

- Jones, M.A., S.G. McLin, M.E. Van Eckhout, and D.E. Walther. 2003. First Fire, Then Flood. In: ESRI 2003 Map Book. ESRI, Redlands CA.
- Mynard, C.R., G.N. Keating, P.M. Rich, and D. Bleakly. 2002. GIS emergency support for the May 2000 Cerro Grande Wildfire, Los Alamos, New Mexico. LA-14007-MS.
- Walther, D.E. 2003. Cerro Grande Fire Burn Severity. In: ESRI 2003 Map Book. ESRI, Redlands CA.
- Walther, D.E. 2003. Cerro Grande Fire Progression from May 5 through May 18, 2000. In: ESRI 2003 Map Book, ESRI, Redlands CA.
- Witkowski, M.S., P.M. Rich, and G.N. Keating. 2003. A Prototype for Enterprise GIS, Los Alamos National Laboratory Report, LA-14027, Los Alamos, NM.
- Witkowski, M.S., P.M. Rich, and G.N. Keating. 2002. Spatial data warehouse design for enterprise GIS. GIScience, Second International Conference on Geographic Information Science, Boulder, Colorado. LA-UR- 02-3514

PRESENTATIONS

Presentations - Meetings and Symposia

- Birdsell, K., D. Hollis, V. Vesselinov, B. Robinson, B. Newman, E. Kwicklis, M. Witkowski, P. Davis, M. Gard, E. Keating, C. Echohawk, G. Cole, B. Carey, D. Rogers, P. Longmire, M. Nilsson, R. Kelley, D. Walther. 2003. Groundwater pathways analysis for the Pajarito Plateau. EES Division Review. (poster)
- Keating, G.N. and T.L. Riggs. 2003. Micro-GIS: Petrographic Analysis in a Geographic Framework. ESRI User Conference, San Diego. (poster)
- Kelley, R.E. K. Crowell, C. Wilson, and S. Reneau. 2003. ALSM-derived Elevation Change in Pueblo Canyon 2001 vs. 2000. ESRI User Conference, San Diego. (poster)
- Kirt Kempter, Shari A. Kelley, Richard E. Kelley, and Greg Cole. 2003. Geologic Map of the Guaje Mountain Quadrangle, New Mexico. ESRI User Conference, San Diego. (poster)
- Mynard, C.R. P.M. Rich, and G.N. Keating. 2003. Lessons from Adversity: GIS Response to the Cerro Grande Wildfire. ESRI User Conference, San Diego. (poster)
- Prueitt, R., M.S. Witkowski, and A.H. Cogbill. 2003. Aerial Magnetic Survey and Geology in the Yucca Mountain Region. ESRI User Conference, San Diego. (poster)
- Rasmussen, S., M. Raven, G. Keating, and M. Bedeau, 2002, Collective intelligence of the Artificial Life community: Successes, failures, and the future, Int'l Conference of Artificial Life 8, University of New South Wales, Australia, Dec. 9-13, 2002. (talk)

Rich, P.M., J. Dozier, S.B. Weiss, and J.I. Metz. 2003. Next generation solar models for ArcGIS. ESRI User Conference, San Diego. (poster)

Rich, P.M., T.L. Riggs, and M.S. Witkowski. 2002. Solar radiation interception, microclimate, and water balance in complex terrain. Chapman Conference, Eco-hydrology of Semiarid Landscapes: Interactions and Processes. Taos, NM, September 9-13, 2002. (poster)

Rich, P.M., T.L. Riggs, and M.S. Witkowski. 2002. Solar radiation interception, microclimate, and water balance in complex terrain. American Geophysical Union, Fall Conference, San Francisco, CA, December 6-10, 2002. (poster)

Riggs, T.L., D. Walther, M.S. Witkowski, C. Echohawk, and D. Hollis. 2003. A New Method to Represent Temporal Datasets. ESRI User Conference, San Diego. (poster)

Robinson, B.A., and Witkowski, M.S., 2003. A GIS-Based Tool for Performing Automated Groundwater Flow and Transport Calculations. SIAM Conference on Computational Science and Engineering (CSE03), San Diego, CA, February 10-13, 2003. LA-UR#: LA-UR-02-5824 (talk)

Walther, D., and M. Witkowski. 2003. Surface Geology for the Los Alamos Regional Infiltration Study Area. ESRI User Conference, San Diego. (poster)

Weiss, S.B., Luth, D.C., Metz, J.I., P.M. Rich, and J. Dozier. 2003. Precision viticulture for fine wine: a grape's eye view. ESRI User Conference, San Diego. (poster)

Witkowski, M.S. E.M. Kwicklis, K.H. Birdsell, and D. Walther. 2003. Infiltration Scenario for the Los Alamos Regional Infiltration Study Area. ESRI User Conference, San Diego. (poster)

Witkowski, M.S., P.M. Rich, and G.N. Keating. 2002. Spatial data warehouse design for enterprise GIS. GIScience, Second International Conference on Geographic Information Science, Boulder, Colorado, September 25-28, 2002. (poster)

Witkowski, M.S., Robinson, B.A., and Batts, C.M., 2002. Three Dimensional GIS for the Storage, Analysis, and Visualization of Large Complex Models, Eos Trans. AGU, 83(47), Fall Meet. Suppl., Abstract NG61A-10, December 6-10, 2002, San Francisco, CA. LA-UR#: LA-UR- (talk)

Presentations - LANL Seminars

Witkowski, M.S., and P.M. Rich. 2003. GIS as a Way to Integrate Data and Simulation. EES Prediction Workshop, May 5, 2003.

GIS SERVICES

1-Aug-02 to 30-Sep-03:

- requests: 111
- hours: 415

- new maps: 203
- map copies: 481

1-Oct-02 to 31-May-03:

- requests: 250
- hours: 1345
- new maps: 242
- map copies: 556

HONORS AND AWARDS

- Marcia Jones, LAAP Award and Spot Award, September 2002

SERVICE

Workshops and Symposia Organized

"Geospatial Metadata Training", 28 August 2002, taught by Amy Budge (Manager of Clearinghouse Services, UNM Earth Data Analysis Center), and Rich Friedman (McKinley County GIS Center), organized by GISLab.

"Where's the Water", 24-25 April 2003. New Mexico Geographic Information Council Spring Meeting, Co-sponsored by Los Alamos National Laboratory, Paul Rich, Speaker Coordinator. John D'Antonio (NM State Engineer and Secretary of NMISC): "New Mexico Water Issues"; Everett Springer (LANL): "NM Water for Energy Initiative"; John Kennedy (NMWRRI): "Creating a Digital Hydrogeologic Framework Model of the Mesilla Basin"; Larry Winter (NCAR): "Virtual Watersheds: Coupled Basin-Scale Water Resource Models for Arid and Semiarid Regions"; Randy Balice (LANL): "Drought Effects on Vegetation: Tree Mortality in Arid Woodlands"; Frank Titus (New Mexico Bureau of Geology and Mineral Resources): "Water Management for Really Smart People"; David Jordan (INTERA) and Peggy Barroll (Office of State Engineer): "Evaluation of Potential Riparian Evapotranspiration Rates for the Carlsbad Area Groundwater Model Using GIS"; Lara Wood (TNC): "Classifying Canopy Closure and Successional Stage Using Landsat TM Imagery"; Kate Krause and Janie Chermak (UNM Dept of Economics): "Assessing Tradeoffs in Water Policy Using Integrated Modeling"; Jeff Simley (USGS NHD Program): "The National Hydrography Dataset for New Mexico"; Steve Hansen (Bureau of Reclamation): "Where's the Water Going?"; John Barney (Sites Southwest) and April Fitzner (U.S. Army Corps of Engineers): "Imaging and Coordinating Ecosystem Restoration Planning: the U.S. Army Corps of Engineers Middle Rio Grande Bosque Ecosystem Restoration Projects"

"Modeling Land Use Change with Cellular Automata: Issues and Challenges", 15 May 2003, seminar by Keith Clarke, chair of Geography at UC Santa Barbara. EES Frontiers in Geoscience Symposium. Paul Rich host.

"CORONA: The Missing Decade in the History of Remote Sensing", 15 May 2003, seminar by Keith Clarke, chair of Geography at UC Santa Barbara. NIS/EES joint seminar. Paul Rich host.

"A Research Agenda for Environmental Science Collaboration", 10-11 June 2003, two-day workshop under the University of California at Santa Barbara - LANL Cooperative Agreement on Research and Education (CARE); day one: "The UCSB-LANL Cooperative Agreement: Past, Present, and Future of Environmental Science Collaborations"; day two: "Use of Science-Based Predictive Models to Inform Environmental Management". Organizers: Kenneth Eggert and Paul Rich (LANL), Arturo Keller and Jeff Dozier (UCSB).

Professional Service

National and International Committees:

P.M. Rich: DOE GIS Core Team; Co-Chair, Ad Hoc DOE GIS User Group.

LANL:

P.M. Rich: Science & Engineering Leadership Team member (EES), LANL GIS Technical Steering Committee

M.S. Witkowski: GIS Technical Steering Committee, Information Architecture Committee for GIS Standards, Knowledge Systems Working Group, Business Process Reengineering Team

G.N. Keating: LANL Knowledge Systems Working Group

T.L. Riggs: GIS Technical Steering Committee

C.R. Mynard: Veterans Committee, EES-9 Safety Committee

State:

P.M. Rich: Board of Directors, New Mexico Geographic Information Council (Speaker Coordinator), Scientific Advisory Board, Institute of Natural Resource Analysis and Management (INRAM), New Mexico State University.

PROGRAM DEVELOPMENT

Proposals

Department of Energy, National Energy Technology Laboratory. "Southwest Regional Partnership for Carbon Sequestration". 10/1/2003 to 1/1/2005. \$1.59M. New Mexico Tech (lead institution, B.J. McPherson, PI), Los Alamos National Laboratory, and 40 other institutions: Paul Rich (co-PI, LANL).

LANL. "Science and technology geographic information system (GIS) for Los Alamos National Laboratory". FY03. \$1.35M. Paul M. Rich (PI). Not funded.

LANL Strategic Research (SR) Institutional Program Development (IPD). "Development of a science and technology (S&T) geographic information system (GIS)". FY03. \$200K Paul M. Rich (PI). Not funded.

LANL G&A. "Support role of EES in institutional geographic information system (GIS) and spatial data stewardship". FY03. \$793K. Paul M. Rich (PI). Not funded.

LANL GIT. "Development of a model warehouse". FY03. \$153K. Marc S. Witkowski (PI), Paul M. Rich, Thomas L. Riggs, and Gordon N. Keating (Co-PIs). Not funded.

RRES Site Model. "Spatial decision support system (SDSS) for risk assessment". FY03. \$820K. Paul M. Rich and J. Christopher Echohawk (Co-PIs), Marc S. Witkowski, Steen Rasmussen, and Thomas L Riggs (additional investigators). Not funded.

UCSB/LANL Cooperative Agreement on Research and Education (CARE) Program. "Influences of topography and plant canopies on surface climate variability". FY03. \$85,000. Jeff Dozier and Paul M. Rich (PIs). Funded.

UCSB/LANL Cooperative Agreement on Research and Education (CARE) Program. "Co-evolution of Wildfires and Urban Growth in Santa Barbara: Implications for Risk Planning and Homeland Security". FY03. \$99,801. Keith Clarke, Steen Rasmussen, and Paul M. Rich (PIs). Not funded.

UCSB/LANL Cooperative Agreement on Research and Education (CARE) Program. "Information Hiding Techniques for Spatial Data Protection and Self-Describing Maps". FY03. \$91,825. Michael Goodchild and Marc S. Witkowski (PIs), Paul M. Rich (additional investigator). Not funded.

Yucca Mountain Project. "Integrated spatial decision support system for the Yucca Mountain Project". FY03. \$890K. Paul M. Rich and Marc S. Witkowski (Co-PIs), Thomas L. Riggs and Gordon N. Keating (additional investigators). Not funded.

National Science Foundation (NSF) International Digital Library Program. "An International Digital Library for Atmospheric Visualization". 10/1/03 to 9/30/05. \$1,074,302. Paul Rich (PI), Michael Ebinger and Laura Marsh (Co-PIs) for LANL. Christopher Klaus (PI) for Argonne National Laboratory. [Overall project \$5M, Keith Andrew (PI) for Eastern Illinois University (EIU), Chad Bahrmann (PI) for Pennsylvania State University (PSU), Gerald Mace (PI) for lead for University of Utah, Peter May (lead) Australian Bureau of Meteorology, and Steve Siems (lead) Monash University]. Pending.

NASA Interdisciplinary Sciences. "Carbon, Nitrogen, and Iron Outflow from Arctic Rivers: Influence on Near-Coastal Systems". 10/1/03 to 9/30/08. \$2,190,900. Paul M. Rich (PI), Julianna Fessenden, Jeffrey Heikoop, Michael Ebinger, David A. Cremers, Shaoping Chu, and Jacques Finlay (Co-Is). Pending

Defense Advanced Research Projects Agency (DARPA). "Wide Area Radionuclide Detection by Gamma Ray Detection on a Remotely Piloted Organic Air Vehicle". 10/1/03 to 10/1/06. ~\$1,200,000. Mark M. Pickrell (PI), Thomas Prettyman, William Priedhorsky, Phyllis Russo, James R. Gattiker, Marc S. Witkowski (Co-Is). Pending

The National Laboratory Partnership. "Environmental Site Characterization and Remediation of ACW Sites". 07/1/03 to 07/1/04. \$380,000. Brent Newman (PI), Mike Ebinger, Allyn Pratt, Marc S. Witkowski (Co-Is). Pending